

ABSTRACT 2

Impact of the Assimilation of Hyperspectral Infrared Retrieved Profiles on Advanced Weather and Research Model Simulations of a Non-Convective Wind Event

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Non-convective wind events commonly occur with passing extratropical cyclones and have significant societal and economic impacts. Since non-convective winds often occur in the absence of specific phenomena such as a thunderstorm, tornado, or hurricane, the public are less likely to heed high wind warnings and continue daily activities. Thus non-convective wind events result in as many fatalities as straight line thunderstorm winds. One physical explanation for non-convective winds includes tropopause folds. Improved model representation of stratospheric air and associated non-convective wind events could improve non-convective wind forecasts and associated warnings. In recent years, satellite data assimilation has improved skill in forecasting extratropical cyclones; however errors still remain in forecasting the position and strength of extratropical cyclones as well as the tropopause folding process. The goal of this study is to determine the impact of assimilating satellite temperature and moisture retrieved profiles from hyperspectral infrared (IR) sounders (i.e. Atmospheric Infrared Sounder (AIRS), Cross-track Infrared and Microwave Sounding Suite (CrIMSS), and Infrared Atmospheric Sounding Interferometer (IASI)) on the model representation of the tropopause fold and an associated high wind event that impacted the Northeast United States on 09 February 2013. Model simulations using the Advanced Research Weather Research and Forecasting Model (ARW) were conducted on a 12-km grid with cycled data assimilation mimicking the operational North American Model (NAM). The results from the satellite assimilation run are compared to a control experiment (without hyperspectral IR retrievals), Modern Era-Retrospective Analysis for Research and Applications (MERRA) reanalysis, and Rapid Refresh analyses.